National Institute of Environmental Health Sciences

The influence of climate change on global crop productivity

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Abstract:

Climate trends over the past few decades have been fairly rapid in many agricultural regions around the world, and increases in atmospheric carbon dioxide (CO2) and ozone (O3) levels have also been ubiquitous. The virtual certainty that climate and CO2 will continue to trend in the future raises many questions related to food security, one of which is whether the aggregate productivity of global agriculture will be affected. We outline the mechanisms by which these changes affect crop yields and present estimates of past and future impacts of climate and CO2 trends. The review focuses on global scale grain productivity, notwithstanding the many other scales and outcomes of interest to food security. Over the next few decades, CO2 trends will likely increase global yields by roughly 1.8% per decade. At the same time, warming trends are likely to reduce global yields by roughly 1.5% per decade without effective adaptation, with a plausible range from roughly 0% to 4%. The upper end of this range is half of the expected 8% rate of gain from technological and management improvements over the next few decades. Many global change factors that will likely challenge yields, including higher O3 and greater rainfall intensity, are not considered in most current assessments.

Source: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3510102

Resource Description

Exposure :

weather or climate related pathway by which climate change affects health

Extreme Weather Event, Food/Water Security

Extreme Weather Event: Drought

Food/Water Security: Agricultural Productivity

Geographic Feature:

resource focuses on specific type of geography

None or Unspecified

Geographic Location:

resource focuses on specific location

Global or Unspecified

Health Impact: ☑

specification of health effect or disease related to climate change exposure

Health Outcome Unspecified

Intervention: ☑

strategy to prepare for or reduce the impact of climate change on health

A focus of content

Mitigation/Adaptation: ☑

mitigation or adaptation strategy is a focus of resource

Mitigation

Model/Methodology: ☑

type of model used or methodology development is a focus of resource

Exposure Change Prediction

Resource Type: ☑

format or standard characteristic of resource

Review

Timescale: ☑

time period studied

Long-Term (>50 years)

Vulnerability/Impact Assessment: ☑

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content